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INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

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COUNTRY Poland

REPORT

SUBJECT Industrial Installations in Poland (Concrete block plant, Institute of Metal Research, coal mines, machine factory (electrical machinery, switches), boiler factory, thermal power plants) - high tension

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A report containing information on the following

a. A plant for manufacturing light concrete blocks near Warsaw.
b. Institute of Metal Research, Katowice.
c. Czeladz Coal Mine in Dabrowa Gornicza (N 50-20, E 19-12).
d. Kosciuszko Coal Mine in Jaworzno (N 50-13, E 19-17).
e. Piotrowicka Machine Factory in Piotrowice (N 50-13, E 18-59).
f. Rybnik Machine Factory in Rybnik (N 50-07, E 18-32).
g. FUT Boiler Factory in Raciborz (Ratibor - N 50-05, E 18-12).
h. M-5 Plant in Wroclaw (Breslau).
i. A-10 Factory in Warsaw.
j. Zeran Power Station in Zeran (N 52-17, E 20-59).
k. Konin Power Station in Konin (N 52-13, E 18-16).

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INDUSTRIAL INFORMATION ON POLAND

A. METALLURGY

1. Light Concrete Plant, Warsaw.

This factory, located near Warsaw, manufactures light concrete blocks for use in the construction of the upper parts of buildings. The blocks, normally 25 x 25 x 50 cm in size, are put inside moulds with cement, sand, limestone, al-tozu,[1] and the water mixture is dried in otoklavs[2] under 10 atmospheres of pressure for 20 hours. The concrete blocks thus produced are 700-900 kilograms in weight. The resistance changes in proportion to the weight. Ex:

Density	Resistance
0.7	60-70 kg/m2
0.9	70-100 kg/m2

The porozite content in the concrete blocks is 60 percent. For 1 mš (sic) of concrete blocks, 220-240 kilograms of cement and 350 grams al-tozu ~~xx~~ are used. Light concrete blocks are used in the construction of the upper parts of buildings where there is no heavy weight to be supported. The production capacity of the factory is 600 m^3 of concrete per day and 140,000 m^3 of concrete per year. The factory's daily prdduction is sufficient concrete for 20 small family-type houses.

2. Institute of Metal Research, Katowice.

In the Katowice Institute of Metal Research, studies and experiments

are being held with metals, security/~~(illegible)~~ i.e. accident prevention, ore enrichening methods, and ways of producing coke. The following explanation was given concerning the subjects that the Institute deals in:

Metallurgy: Mineral Geology.

Water Geology.

Underground coercions and movements.

Explosion of rock under pressure.

Mining methods.

Aeration.

Ramble[3](sic), especially hydraulic.

Underground mineral fortifications Gerlach GHR types.

Mechanization: Rickhoff type pools of 40,50,80 Ps. in production.

In loading: Emice type loaders of 0.30 m^3 and 0.75 m^3.

In transportation: armoured conveyors of 620 mm.

Hydro-mechanization - digging of underground water and conveyance. Because of the rubber transportation band shortage, hydro-mechanization possibilities were considered and started to be put into practice in 1954. In underground coal abataj,[4] water under high pressure is being used directly on soft or medium strata and on hard strata after they are loosened by blowing up. The water pressure changes between 25 and 300 atmospheres. The underground transportation is being carried on by water and by oblique tin gutters. Thin coal is carried over the ground by pumps and pipes. The coal water proportion is one-third at its most, since more of it would not be economical because of erosion. The dimensions of coal must not exceed one-third of the internal pipe diameter.

Chronometry.

Technical and economic statistics.

Electro-mechanization--the subject of energy in mining, water, steam, compressed air, electric.

Mineral machinery.

The use of solid combustibles.

Underground and above-ground gasification experiments, technical analysis, practice in the mines.

Security: Explosions on fire-damp, electrical failures, mine fires, accident appraisement.

Enrichening of ores: Various experiments on this topic.

Qualities of producing coke: Experiments on ways of converting coal

The Czelad~ Coal Mine produces 4,300 to 4,400 tons of coal daily, and 1,300,000 tons per year. The mine pit is 210 meters deep. There are five main coal veins, three of which are 0.60-1.80 meters thick, and the other two, being large veins, 1.80-4.00 meters thick. The angle of these coal seams is 4 to 5 degrees. The coal is quite hard, and the production is carried out by mechanical and

hydromechanical methods.

In mechanical production, in the case of the thick veins, the [ ] 50X1-HUM
out
method is used; 12-15 percent of the production is carried/by the [ ] method, and the rest by the [ ]. For thin veins the [ ] method is prac- 50X1-HUM
ticed. The pedestals are of 60 and 90 meters. For a pedestal of 60 meters, 210 pieces of 170-cm fuses are fired. Sixty percent of the loading is carried in the [ ] and 40 percent by manipulation. 50X1-HUM
4
first
Transportation is accomplished/by armored gutters, then by belt conveyors and finally by wagonets of 2.5 tons pulled by trolley locomotives of 42 KW. The use of [ ] in loading doubles the labor capacity. 50X1-HUM
[ ] sand is brought from a place two kilometers away and [ ] is made in parts of 6 to 10 m. Twelve of the present 24 pedestals are used for production and the other twelve for [ ]. Two 50X1-HUM
shifts [ ] are busy with production, and one with the preparation. 50X1-HUM
In each pedestal there is a [ ] Polish consumption is 40 percent greater because of the [ ] and it is 21 dm^3 per ton. 50X1-HUM

In hydromechanical production and transportation, if the coal vein is hard, it is loosened by firing the mine. When it is soft, it is cut [ ] and transported directly by water of 24 atmospheres 50X1-HUM
pressure. The amount of water is 10 m^3 a minute, and the water used is 3-4 m^3 to one ton of coal. Transportation gutters are made of tin of 4 mm. These are 310 mm deep, 642 mm wide at the upper parts, and 375 mm wide at the bottom. The monitor (sic) pumping the water under

high pressure is 8 to 12 m away from the mirror. When the coal which is transported by the gutters and water reaches the main transportation gallery, it is put through a sieve of 10 mm swing, + 10 mm falls directly into the wagonets, and -10 mm (22-23 percent) goes to the pool where the water is collected. The coal which sinks to the bottom there is taken by scrapers. Since extraction by water needs a high pressure over 200 atmospheres, it cannot be practiced (sic). The amount of coal produced and transported by the hydromechanization method is 380 tons. It is intended to increase the amount to 500 tons.

There is no fire-damp in the pit, and there is a rule against smoking. There is a great deal of water (as high as 4 m^3 per minute). Consequently the laborers suffer from rheumatism.

The total number of daily workers is 3,350 of whom 2,200 are underground laborers. Since the coal contains 7 percent ash, it is not washed. The low calorie of the original coal is 6,800. The coal production is delivered by the State to the exploitation administration for 183 Zlotys per ton. The actual cost is a little less than that amount. On the other hand, the State buys the coal of certain sizes for the prices listed below:

+50 mm	165 zloty/ton
18 - 10 mm	135 zloty/ton
-18 mm	105 zloty/ton

5. Kosciuszko-Nowa Coal Mine.

This mine, located near Katowice, is 290 m deep and was recently opened to exploitation. The present daily production is 2,700 tons, and it is planned to increase this amount to 5,000 tons by 1960. There are five principal coal veins the thicknesses of which are listed below:

1	2 - 4.5m
2	2.8 m
3	1.8 m
4	1.4 m
5	1.6 m

Pedestal explosion [redacted] yield: 88 percent; room and heel [redacted], yield: 70 percent; and hydromechanical methods are being used for production; hydraulic [redacted] is being practiced. In mechanical production the loading is carried out by factory cutting and loading [redacted] Armored conveyors, belt conveyors, and finally wagonets of 2.5 tons and trolleys (220-250 volt DC) are used for transportation. In hydromechanical production and transportation, water of 60 atmospheres pressure is used. There are two centrifugal pumps of ten steps, the capacity of which is 4-5 m^3/minute. The water pipes and the [redacted] 12 mm in thickness, are welded in the principal network and they are [redacted] in the subordinate networks.

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The water used per ton of coal produced and transported is 3 m^3. When the coal is hard, it is loosened either by firing through the mine, or by using water under pressure. Tin gutters are used for transportation,

[redacted] 50X1-HUM

and the coal is sifted through the main transportation gallery by a sieve of 0.75 mm swing. An amount of +0.75 mm falls into the wagonets of 2.5 tons, and -0.75 is carried to the pool where water is gathered by water (sic). (Three percent coal in water.) The coal which sinks to the bottom of the pool is taken by chained scrapers.

Labor Productivity

Underground	1.8 tons/daily
General	1.1 tons/daily

The coal produced contains 12 percent ash and 14 percent dampness, and its calorie content is 4,800-5,000.

6. Piotrowicka Machine Factory.

The Piotrowicka metal machinery factory, located near Katowice, employs 1,300 workers. The production program of the plant is as follows:

[redacted] 50 PS, 80 PS 50X1-HUM

Band Conveyors

Pit Winches 7, 10, 15 PS

This year, [redacted] loaders of 75 KW will go into production. 50X1-HUM

After 1962, belt conveyor production will be stopped and only [redacted] 50X1-HUM and reducers will be made.

7. Rybnik Machine Factory.

The production program of the metal machinery factory at Rybnik, 60 kilometers southwest of Katowice, calls for extraction installations, armored conveyors, and chained conveyors.

SECRET [redacted] 50X1-HUM

SECRET

B. ENERGY

1. The F.U.T. Boiler Factory at Raciborz.

The projects of the F.U.T. boiler factory at Raciborz, near Katowice, the coal and industrial center of Poland, have been undertaken since 1950, and the production amount is increasing at a very high speed. Thus, the production for the first three months of 1957 has exceeded twice the 1956 yearly production. One explanation for this sharp increase is the fact that some of the plant's machinery had not yet been completed in 1956. The factory is in process of being expanded and new machines are being brought in. Among the machines a 4,000-ton press, used in the making of the largest drums, was imported, but the other presses of lower tonnage and all other machinery were made in Poland.

For the present time, boilers of 110 atmospheres and 230 tons are being manufactured here. In addition, the plant has received orders to build two 470-ton boilers. These boilers will be of 140 atmospheres and 540 degrees. At the moment, the plant is working on two shifts a day, and the number of employed laborers is 1,500. This number will be increased to 2,000 by the end of this year, and to 3,000 by 1959.

Since this plant cannot make all the necessary parts of the boilers, the armatures, ventilators , pipes and measuring tools are obtained

from other factories of the industrial institution to which the F.U.T. factory is connected. Important moulds also are brought from other factories. All the other boiler parts including all kinds of grates are made in this plant.

In Poland during the pre-war phase, German K.S.G. and Stein and Müller and British Babcock andWilcox patents were being made. Now they are gradually developing their own types. However, they have not lost their contact with the large foreign manufacturers.

Any kind of order for boilers comes first to the central bureau at Tornowsky Gory. There the general accounts and the pictures of the boiler are made, and certain parts are ordered from several factories. In the meantime, the order is sent to the Raciborz plant. The Raciborz plant insures coordination between the boiler and the parts such as armatures, ventilators, etc., which were ordered from other factories and also fits the boiler into its place. Detailed drawings and accounts of the pipes and other parts of the boilers are made in the designing offices of the Raciborz plant. The project in advance of the brick business (sic) is made at the central office, the final and/detailed drawings are made in the Industrial Mining Engineering Bureau, which is a different institution. The Raciborz plant also produces boilers with grates, usually boilers with turning grates, the 0-1 mm part of which is 50 percent and which burns coal of 0-10 mm. The waste in those boilers is approximately two percent.

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[redacted] a drum [redacted], the internal diameter of which was 800 mm and the et thickness 250 mm, formed of several steel layers and belonging to a special boiler of 500 atmospheres, to be used in the chemical industry.

2. The M5 Plant at Wroclaw.

The M5 plant, which was established in Wroclaw in 1947, is one of the factories producing moving electrical tools. It is now being expanded. The production field and its limits are as follows:

Thermic turbine alternators of 25,000 KW and hydraulic turbine alternators of 30,000 KW are now being made. The plant is starting to build two alternators of 50,000 KW and to fit the necessary machinery for making 100,000 KW alternators. Asynchronous motors up to 3500 KW power, permanent current motors up to 2500 KW power and dynamos for the metal and steel industries and Leonard systems are being made. Motors for electrical locomotives (FAWAC), synchronous motors with asynchronous [redacted] for use in cement factories, complete welding machines of 30 volts and 300 amperes, and electromagnetic winches are also built in this plant. 50X1-HUM

The moulding parts necessary for this factory are ordered from other plants. Although the insulating material and electrical transmitters are obtained from transmitter factories, new workshops for necessary transmitters and insulating matters will soon be opened for this plant. [redacted] 50X1-HUM

The tin material of 1.6 w/kg used for the alternators, and the magnetic tin material of 2.3 w/kg used for the other machines are made in Poland. Aluminum is used as a transmitter in the dynamos of the welding machines and the bobbins of the eletro-magnetic winches. In those, the insulation is aluminum oxide, and it is C-type insulation, which can tolerate (above all the limits) heat as high as 125 degrees.

There are now 1½ shifts working in the M5 Factory, and the total number of personnel is 2,000. This figure will be increased to 3,800 by 1960 when the present expansion will have been completed.

According to the present orders, the production of this factory, which closed the year of 1956 with production figures of only 2,972 tons and 266,000 KW, will amount to 6,404 tons and 910,000 KW by 1960. The weight per KW is accounted for by the gradual production of larger units.

3. The A10 Factory of Fixed Electrical Instruments, Warsaw.

The products of the A10 Factory of Fixed Electrical Instruments, near Warsaw, are listed below:

Compressed air switches of 6-110 KV. These are made up to 3500 MVA cutting power and delivered complete to the owner.

Switches for re-closing in single or in three phases are also made.

Preparations are being made for the production of switches of the same capacity but with less oil

The plant is currently producing switches with complete oil usage [redacted] up to 30 KV and 600 MVA. 50X1-HUM

Production of 220 KV switches is now being considered, but for the present the Poles prefer to import them.

[redacted] up to 110 KV and 1000 A are produced. Two years from now, those of 220 KV will also be made. Although the present machines are sufficient for 220 KV, the type and the project subjects have to be settled first. 50X1-HUM

Measuring transformers and lightning rods up to 110 KV are made. Next year the same items up to 220 KV will also be produced. The lightning rods are made up to 10,000 amperes. At the same time, lightning rods with petroleum [redacted] carrying 15 KV, and 4 MVA, fusible plugs of 6-15 KV, cells for 6-15 KV and open air cells, air installations of complete pressure (except the compressor and the motor) are being made. The measuring and the control instruments that are fitted inside the tables [redacted] and the cells are obtained from other factories. 50X1-HUM 50X1-HUM

This factory, in short, delivers complete switch installations except transformers, and the transformers are made in the M3 Factory.

4. Zeran Thermic Power Station.

The Zeran power station, which is located near Warsaw, and which serves to heat one-fifth of the city by the steam obtained through the turbines, currently maintains five boilers of two drums, 230 tons, 110 atmospheres and 510 degrees each and a group of 6 turbo-alternators of 30 MW. By the end of this year, two boilers and another group will be added to this. The plant burns coal of 4800 calories. In each boiler there are two coal mills with balls each of 21-ton capacity. The alternators are cooled by hydrogen. Five kinds of [redacted] steam (in 30, 17, 8, 1.2-2.5, 0.5 atmospheres) are obtained from each turbine. A total of 100 tons of steam per turbine per hour is produced through the levels of [redacted] atmospheres. 50X1-HUM

The steam which is between 70 and 150 degrees passes through the transformers and is used for heating the city. The transformers are located at the machine section. There are now six increasing transformers of 31.5 MVA and 6.3/110/15 KV, and by the end of this year, one more will be added.

There are now four autotransformers [redacted] of 110 KV from the power station, 50X1-HUM
and these are connected to the 110 KV ring of Warsaw. In the power station 0.4 kg. coal is burnt per KVH. This yield corresponds to the maximum [redacted] steam yield in the turbine. During the 50X1-HUM
coldest months, if the [redacted] steam is not enough for heating the city, the steam is taken directly from the boilers and made to pass through different transformers. As for the hottest summer months, the steam which is obtained from the 1.2-2.5 atmosphere level is only used for the interior requirements of the power station. Each alternator has a [redacted] (13) of 3.3 KV, and these bars are con- 50X1-HUM
nected with each other. The network of 110 KV can feed this bar. There are no auxiliary diesel groups. The ring of 110 KV surrounding Warsaw is connected to the circuits of 220 KV coming from Silesia by [redacted] (14) of 110/220 KV. 50X1-HUM

The water of 15 German tenacity degrees (sic) from the Vistula River passes directly through the condensers following a period of testing, and in very cold weather the return water also is sent to this resting pool. The condensers, which contain two cells each, are cleaned two to four times a year while th[redacted]king. Each cleaning lasts a week. 50X1-HUM

[redacted]

Each boiler has an electrical feeding pump. There are also two turbo pumps for all eight boilers. In the six present boilers, which are Soviet-made, there are no ash blowers. In the ones that are recently founded there are blowers working with [redacted] steam. The [redacted] 50X1-HUM adjustment of the boilers is conducted through cold water pipes.

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The electrically operated automatic boiler control is going to be converted to electronic control (sic). The power station ashes are sent to a distance of 7 kilometers by water of 40 atmospheres pressure.

The power station costs 900,000,000 zlotys including the expansion (except the cost of the site itself). The number of power station personnel including those working on the expansion of the plant and the trainees is 800. Even the major repairs at the power station are made in the power station's workshops.

5. Konin Thermic Power Station.

The Konin power station is being installed at a place 210 kilometers from Warsaw, in the middle of the lignite area. Coal of 1800 calories containing 50 percent moisture and 15-18 percent ash [redacted] is 50X1-HUM burnt. Water of 18 degrees hardness taken from a nearby lake is used for cooling. When completed, the power station will include nine boilers and nine turbine groups. Two of the boilers are Austrian [redacted], four are East German, and the remaining three are Polish 50X1-HUM made. Each boiler is for 230 tons per hour under 84 atmospheres pressure and 510 degrees C. In each boiler there are four mills

with hammers [redacted] located at the corners, but only 50X1-HUM
three mills are sufficient. Each mill feeds a burner. When one of the mills is out of order, hot air is still sent to the boiler through the burner of the mill, so the movement routine in the furnace is not disturbed. The gas temperature going to the mills goes up as high as 500 degrees. While the coal is being sent to the boiler from the mill, it has 170-200 degrees of heat and approximately three percent moisture. Each boiler has two bunkers, one of 400 and the other of 100 M^3. The larger of these bunkers is for lignite of the qualities given above, and the smaller will be first for the [redacted] 50X1-HUM
of 2500 calories that is brought from Silesia, and later for the refined coke that will be produced in the plastics plant to be established in the vicinity.

The amount of coal (500 tons per hour) needed by the power station is unloaded directly from the railroad wagons through concrete funnels on two oblique bands. It first passes through vibrating electricity, and the ones staying above (sic) go to the breakers. No hot gas is sent to the breaker, hence this prevents the danger of explosion by preventing the lignite's contact with the hot gas during its journey from the lignite furnaces to boiler mills. On the other hand, in order to prevent the coal from sticking and in order to facilitate its flow, whenever necessary air of 6 atmospheres is sprayed through some points of the bottom laterals of the bunkers. These are not cyclone type boilers. [redacted] in boilers 50X1-HUM
burning different kinds of coal, the cyclone type was not preferred, 50X1-HUM

[redacted] 50X1-HUM

since there was the danger of freezing in case of a change of the ash melting temperature.

Three of the six turbines now on order will be of 55 MW, and three will be 50 MW. The first fixed one will be of 50, the second and third will be of 100 MW apiece. There is no reheating. The turbines have two trunks each. There are four [redacted] steam levels in the first and one in the second. 50X1-HUM

The boiler section of the power station is the closed type, and was built in such a way that the boilers were founded in turn. That is, after completing the fitting of a boiler by a winch movable on a rail, the winch is taken back and work is started on the other boiler, and the ceiling of the building over the completed boiler is covered. Three reinforced concrete chimneys, 110 meters in height, are being built by moving moulds of an expert firm. Thus, the building of every chimney takes about two months.

[redacted] two more power stations, one of 300 and the other of 400 MW, would be built in the area where the Konin power station was located. 50X1-HUM

6. General.

Poland now possesses 5,000,000 KW of power installations, producing a yearly output of 20 billion KW. The interconnected network is of 220,000 volts, and/a proposed line of 380,000 volts, running from the south toward Wars[redacted]truction. 50X1-HUM

There is a power project office connected with the Polish Ministry of Metals and Energy, and the energy studies and projects of the country are conducted by this bureau. These projects are practiced by the PDKIT Bureau connected with the Ministry of Industry, which organizes complete power installations.

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